Quantitative study of fine dust-stabilized emulsions using optical laser tweezers

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Recently, environmental pollution problems due to fine dust have been becoming serious. Accordingly, various methods for removing or recovering fine dust have been investigated. In this work, we developed a novel and facile method to eliminate ultrafine dust dispersed in water on the base of irreversible adsorption phenomena of nano-micro sized solid particles to an oil-water emulsion surface. Using optical laser tweezers, we found that the surface charge and the shape irregularities greatly affect the interfacial adsorption efficiency of ultrafine dust particles. In addition, the adsorption phenomenon of the individual particles studied on the microscale showed an excellent agreement with the macroscopic results regarding the formation and stability of the Fine Dust Particle emulsions.